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ABSTRACT

The New Rural Society (NRS) project is federally funded to apply telecommunications technology to ease the plight of the cities by upgrading life in rural communities. The resulting voluntary decentralization of people, business, and government, will, it is hoped, create the necessary conditions to bring the urban and energy crises under control. During its four and a half years of existence the NRS project has conducted a broad study of the historical influences of science and technology and a number of studies in five specific areas: employment, health care, continuing education and vocational training, entertainment and cultural opportunities, and community interaction. This paper gives a general overview of these five specific studies and discusses the implementation of NRS recommendations, both in general and in detail for such areas as transportation, urban needs, employment, health care, adult and vocational education, postal service in rural areas, environmental protection, energy, and communication service. (JY)

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COMMUNICATIONS FOR SURVIVAL

Perspective and Proposed Programs

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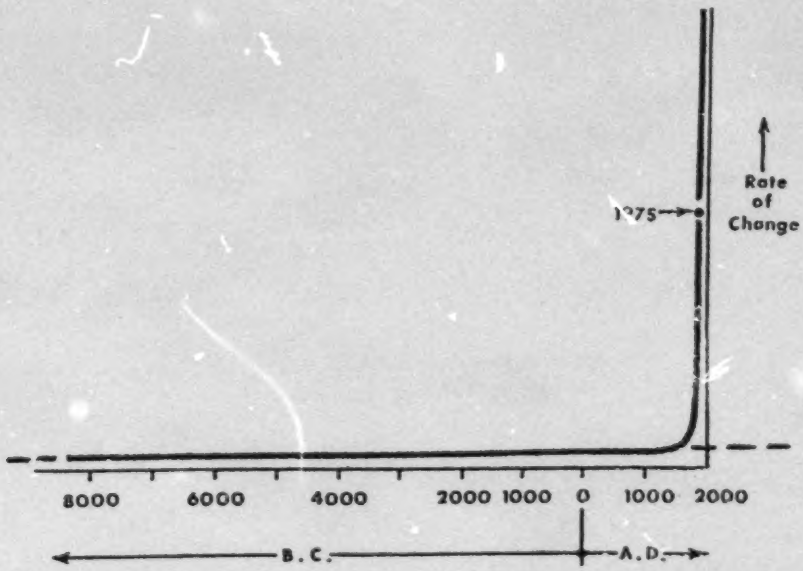
I. INTRODUCTION

Ten thousand years ago, the world population was no greater than New York City's today, and during most of this period, population doubled every 2,000 years. Today, the rate is 35 years. This sudden rate of change applies to many other aspects of the world which man has created around him. An attempt to illustrate the impact of science and technology on civilization over the past 10,000 years in terms of change is shown below.



The horizontal section of the curve and its extension in dashes also shows man's physical, mental and behavioral development, which according to anthropologists remained essentially constant during this period.

The factors which were combined in the vertical axis are typical data reflecting the developments of science and technology, such as population growth, life expectancy, power of explosives, speed of travel, consumption of milk, pharmaceuticals, energy, minerals, etc. etc.

But the sudden upturn of the curve which only occurred during the last 200 years, also indicates the alarming rate at which we are consuming our non-replenishable resources. The extremely rapid changes now pointing in a vertical direction were neither anticipated or planned and the slow rates prevailing during most of man's history, did not equip us to cope with the critical stresses and strains that befell our civilization.

While the last two centuries stand out as a triumph for science and technology, have they been a triumph for mankind as well? Have we been so involved in our own disciplines that we have overlooked many of the true needs? At this point in history, science faces a responsibility and a challenge which we must not fail to meet. We should apply at least a fraction of our diverse talents and training towards meeting our major national and social needs. Through our accomplishments in communications and transportation, we shrank the world, yet the distance between people has not decreased.

Our major national problems when grouped into three major categories, result in the urban, rural and energy crises. At the beginning of the century, one-third of the population in the United States was urban, and two-thirds rural. A gradually mounting migration, totally unplanned, led to the current population distribution of the three-quarters urban (and suburban), and one-quarter rural.

As one consequence, urban centers had to expand rapidly to accommodate vast numbers of people, yet within finite geographic boundaries, thus creating unprecedented social, economic and environmental problems. Concurrently, rural areas began to decline and were unable to compete with the real or imagined attractions of urban living. The third consequence, we believe, is the accelerated exhaustion of our energy resources. The current urban, rural and energy crises are closely interlinked, and it is essential to characterize each briefly.

If crime is a symptom of social disintegration, then urban areas are in alarming contrast to rural conditions when for instance, fifteen times more street robberies per unit population occur in a city of one million than in a town of ten thousand. In addition, pollution levels, congestion, estrangement, are all signs of a population saturation with which we are not yet able to cope.

Many people and, indeed, businesses (at least those who could afford it) have chosen to locate in suburbs in the hope of escaping some of the urban problems. This has merely expanded the boundaries of urban areas so that sprawl and overcrowding began to impair the quality of suburban life as well, while those who remained behind create an almost catastrophic drain on the city's economic resources.

As the result of the exodus by young people from rural America to build their future in the metropolitan centers, a gradual degeneration of rural life occurred. Lack of employment opportunities and human services as well as some of the cultural and recreational amenities of the large city are factors

impeding a reversal of the unfortunate but understandable migration patterns.

Paralleling this huge totally unplanned population dislocation has been an uncontrolled use of our energy resources. For instance, the extremely centralized population distribution depends upon electric power generation, with low pollutant oil and unable to use our abundant coal supplies.

Regarding needs of oil for transportation, one-third of all the gasoline used in this nation is for daily commuting in our large metropolitan centers to and from work.

The first concerted effort to apply science and technology, and in particular the communications disciplines to national problems, took place in the National Academy of Engineering's Committee on Telecommunications in 1971.[1] A far reaching conclusion was the proposal to create a special project called the New Rural Society to apply telecommunications technology to ease the plight of the cities by upgrading life in rural communities. This would make possible a voluntary decentralization of people, business and of government, creating the necessary conditions to bring the urban and energy crises under control as well.

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(1) Communications Technology for Urban Improvement, National Academy of Engineering, June, 1971

II. Overview of Specific Studies and Experiments Pursued by the New Rural Society Project to Date

The New Rural Society (NRS) project was funded under a grant from the Department of Housing and Urban Development and more recently, the Department of Transportation, both under a primary contract to Fairfield University, Connecticut.

During the last four and a half years, the NRS project has conducted a broad study of the historical influence of science and technology, and in particular, the role of telecommunications as a tool to aid in solving social problems. At the same time, a number of studies in specific areas (employment, health care, community interaction, teleconferencing, etc.) were carried out, together with actual tests and pilot operations. These will be summarized in the following, along with references to publications by the NRS project.

NRS has identified five areas considered critical to the development of viable rural communities and where communications technology could make a significant contribution. Specifically, these are:

1. employment;
2. health care;
3. continuing education and vocational training;
4. entertainment and cultural opportunities; and
5. community interaction and planning.

Employment

As one of the major conditions, it is essential to create job opportunities in rural towns in order to retain people who might otherwise leave as well as to attract new residents from congested areas. For urban business to consider decentralization to rural areas, requires assurance that such a move will result in a more cost-effective operation. Organizations are often concerned that relocation may be more dependent on and raise the cost of their communication activities, consume more employee time, cause delays or even the loss of essential contacts. It is the contention of NRS that these problems may be overcome in most cases by proper planning and suitable application of existing telecommunications technologies.

In order to provide a basis for this planning, NRS tested its newly developed communications audit technique with several of the state of Connecticut's criminal justice agencies.(2) The purpose of the communications audit is to establish the internal and external communications processes and requirements of an organization and to show how reliance upon travel and complex communications systems might be minimized. Once an organization's communications patterns have been established and analyzed, it becomes possible to plan for changes that would make them more effective and to identify those organizational components which could be relocated most

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(2) "Office Communications Analysis of the Motor Vehicle Department of the State of Connecticut." New Rural Society Project, 1975; and "Office Communications Analysis of the Corrections Department of the State of Connecticut", New Rural Society Project.

easily to a rural area by virtue of their communications requirements.

Another effort has been devoted to the study and design of an electronic system that could serve as a satisfactory alternative to face-to-face business conferences in decentralized government and private organizations. A field trial of the NRS audio teleconferencing system by the Union Trust Company Bank of Connecticut showed the system to be a highly useful, well-utilized technique for conducting regular meetings between bank executives in two cities. The teleconference system was judged to be a favorable alternative to travel for most meetings and led to more effective time utilization. The monthly costs associated with teleconferencing (depreciation of equipment and monthly charges for telephone lines), represented only 50 percent of what the Bank would have had to spend for transportation and executive time if the same number of meetings had been conducted on a face-to-face basis.[3] Finally, the ultimate affirmation of the system's usefulness came from Union Trust Company itself which elected to purchase the teleconference system after the completion of the field trials.

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(3) "The Field Trial of Audio Conferencing with the Union Trust Company", New Rural Society Report, Joseph F. Tomey et al.

Health Care

Aided by the Governor of the State of Connecticut as well as health officials and physicians, studies of rural health care in certain areas of the state were carried out.

Access to essential health care services is commonly not available to rural community residents. A recent survey found that one-third of all rural and small town respondents ranked health problems on a par with, or even slightly above, income as their primary personal concern. Moreover, having sufficient income does not guarantee residents of sparsely populated rural areas the delivery of adequate medical services.

In recent years, increasing numbers of doctors have chosen to work in research laboratories, industry, public health, and other institutions, or to join academic faculties, or to serve as hospital administrators. The result is that about one-third of all U.S. doctors now devote themselves to such pursuits and the proportion of physicians who meet the total primary care needs of patients on a continuing basis, has been diminishing nationally.(4)

The disparity between the availability of medical services in urban areas (excluding the ghettos) and rural communities is considerable. Physicians tend to settle in urban or suburban places because their families --- like three-quarters of the American population --- prefer the amenities offered by a metropolitan area. Moreover, physicians find that metropolitan hospital facilities provide them greater professional stimulation.

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(4) Abstracts of the New Rural Society Project

These two trends --- toward increasing specialization and toward the concentration of doctors in metropolitan centers --- have served to deprive many rural community residents of adequate health care. Although "the total number of U.S. physicians has increased 28 percent during the past decade, the proportion in general practice has dwindled sharply, and many rural areas have lost nearby medical service entirely. The doctor-population ratio of one per 500 in New York State is almost three times that of mostly rural South Dakota."(5)

It should be noted that consideration of ratios alone, does not provide an adequate measure of either the quality or quantity of American health care. For instance, in 1973, there were 138 counties in the country which had no active physician for patient care. Specifically, states such as Missouri, Nebraska, Georgia, South Dakota, and Texas each had more than a dozen counties without any practicing doctors.

Because access to health care services in rural sections of the country tends to be extremely poor, another focus of the NRS project has been to help improve the quality of services in these areas. It is believed that the most effective approach to good care and effective cost control is through a comprehensive systems approach, which means that the health care system must be looked at and planned for as a whole. Emphasis must be on prevention, early diagnosis, and on less costly care, rather than on the current approach

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(5) "Federal Project Eases Rural Doctor Shortage By Dispatching New Medical-School Graduates", Jonathan Spivak, The Wall Street Journal, November 19, 1974

of forcing many people into hospital and nursing home care. In addition, people need to be continually educated and informed in order to be able to express their needs, and be able to communicate meaningfully with medical personnel, when a problem occurs.

The specific NRS proposal for a Northeastern Connecticut region envisions an integrated operation of the existing medical resources in the area selected, along with the technical and systems development expertise of the project team.(6)

It is crucial to the health program that health education be offered to the residents of the community and professional learning opportunities be provided to physicians. To meet this need, a new delivery system, called RTS (Rapid Transmission and Storage), has been developed in collaboration with a group of leading community colleges. RTS integrates the best available technology resources into a universal learning system, and makes it possible to provide a wide range of learning materials, including health education, to be made available near to where people live and work at convenient times and affordable cost.(7)

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(6) Abstracts of New Rural Society Projects

(7) Ibid. Abstracts

Community Interaction and Planning

The separation of job from residence, together with other aspects of suburban living, has made it difficult to realize a high degree of community interaction and planning. The average individual today moves around more than ever before and tends to play a number of roles. Under these circumstances, different communities may be appropriate for different roles in which an individual is involved.(8) This makes it difficult to define the term community precisely. A definition that would probably prove acceptable to most scholars, however, is the following: "A community consists of persons in social interaction within a geographic area and having one or more additional common ties."(9)

Of late, greater attention has been focused on the interaction processes of a community. There is a sense that contemporary social organization has been destroying some of the more meaningful human associations and values that small town residents have traditionally acquired in church, family and neighborhood.(10) When people do not live and work in the same location, they may be less inclined to involve themselves in community affairs. Similarly, working parents who travel long distances to their jobs may have very little time during the week to spend with their families. Thus, the critical role that

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(8) Abstracts, The New Rural Society Project's Reports, page 2.

(9) Harold F. Kaufman, "Toward an Interactional Conception of Community", Perspectives on the American Community, edited by Rolan L. Warren (Chicago: Rand McNally & Company, 1973), p. 63.

(10) Robert Nisbet, "Moral Values and Community", Perspectives on the American Community, p. 87.

parents are expected to play in the nurturing and transmitting of human values from generation to generation can suffer from commuting. What this suggests is that the centralization of political and economic power in large metropolitan areas may not serve the best interests of society.

Much thought has been given to the problem of how to reclaim a sense of community. It is believed by the NRS project that, if people live and work in the same town, they are more apt to become involved in local affairs and to develop a sense of commitment to a particular community. In addition, however, localities may need to establish a focal point for community activities in order to successfully encourage citizen participation. This has led some towns to create community centers. Generally this approach has proved most useful where activities have emerged from real needs identified by the residents of the town.

An experimental community communications center established by NRS in a Northeastern Connecticut town demonstrated that valuable services could be provided by such a center.(11) A survey of area residents after the limited pilot demonstration indicated interest was greatest in continuing education opportunities and improved delivery of public services. This coincided with the NRS view of a community communications center. Potentially, a center can foster community interaction by offering a variety of cultural and educational activities and by providing a forum for the debate of important public issues. At the same time, it can use its communications facilities to improve the

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(11) Ibid. Abstracts

delivery of human services. The very fact that the center presumably brings together under one roof diverse activities and services, permits the identification of those areas where considerable overlap exists and consolidation may be warranted, as well as those community needs which appear as yet unmet by any agency.

One of the primary issues to be faced in all communities is their need to plan for the future. In cooperation with the Windham Regional Planning Agency, Willimantic, Connecticut, NRS undertook baseline studies and analyses of the region's living conditions and the attitudes of residents, resulting in a new way of addressing planning problems.[12]

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(12) Ibid. Abstracts

Transportation

During the past six months, when the Department of Transportation has funded the NRS project, the long-range objectives of DOT's interest in it were:

- to investigate the implications for transportation technology of the redistribution of population to non-metropolitan areas.
- to investigate how and under what circumstances telecommunication might constitute an acceptable alternative to the movement of people and goods.
- to investigate the complementarity of transportation and telecommunications in stimulating rural economic development and growth.
- to propose planning considerations which would help local government officials and citizens in rural areas to plan more effectively for the improvement and development of their area.

Of the five major factors required for rural development and where communications technology can have significant impact, employment is considered the most basic dimension, although all five are regarded as essential. Because of the constraints of time and money, rural economic development is receiving the emphasis in this research program.

It is recognized that no two rural areas in the United States are directly comparable. Yet rural communities, anxious to attract industries to their areas, do face common planning problems when it comes to projecting how different mixes of telecommunications and transportation might impact on their economic development potential.

In its current research effort, under contract to the U.S. Department of Transportation, NRS is investigating the role of communications and transpor-

tation as complementary forces in rural economic development. Although the NRS Concept identifies five dimensions of the quality of life -- employment, health care, education, entertainment and community involvement -- the current study focuses primarily upon employment.

The present study has selected two rural counties (Indiana, Pennsylvania and Pitt, North Carolina) as study sites and visits have been undertaken which, in combination with recent census data, give detailed economic, educational, medical and social profiles of the counties. The results of these profiles and extensive information from state, regional and local planners comprise the current study's data base.

As part of the study, NRS is using an econometric forecasting model which is capable of projecting the economic impact of changes in the industrial environments of the two study sites with extreme accuracy. Currently, the model is capable of predicting the impact of transportation improvements on industry output, employment, income and population, as well as pollution levels and energy use. NRS is developing communication indices which, incorporated into the model, will be able to assess the impact of communications improvements as well on these variables. It is expected that the economic impact of both communications and transportation as complements will be greater than the sum of the impacts of each taken separately. This hypothesis will become increasingly important as greater percentages of the U.S. economy become information- and service oriented, where accessibility through communications is more important than accessibility through transportation.

Under the section on "Implementation", using the results of the model, its own previous research, and that of others, NRS proposes to investigate specific applications of communications and transportation in the study sites. In this regard, all of the quality-of-life dimensions will be included. Under consideration will be applications of these two technologies to enhance employment opportunities for current and future residents of the counties, provide improved educational delivery to residents (especially in the areas of adult and vocational education), upgrade the level and quality of health care services, furnish cultural and entertainment opportunities, and foster involvement in the community.

III. Implementation, General Considerations

A full implementation of the NRS plan is tantamount to setting a new national goal. To optimize the match between population distribution and our available human, environmental and energy resources in order to be independent of imports and assure a high quality of life for all Americans for many centuries to come, represents an enormous effort hard to visualize, let alone execute, within one generation.

The experience within the NRS project has shown that the desired goal could be reached by the end of this century if one divided the entire problem into many smaller, manageable ones. Making decentralization a goal within each of the 50 states, where needed, would come close to accomplishing this purpose. Clearly, there are a number of states on the Eastern and Western Seaboards where the population density is already so high that effective relief could only be derived from making migration to less densely populated states desirable.

In order to alleviate the urban problems, the poor and minority groups should be able to decentralize first. For the many low-populated and economically underdeveloped regions of this country, self-planning has to come to grips with the fact that economic growth, through a decentralization of business and government, will require accepting a limited amount of immigration to fill the new jobs together with those already there and seeking employment. Here again, communications science along with many other disciplines in the broadest sense plays a major role. Where the states

represent the natural individual decentralization units, there is the advantage that they are largely self-contained politically and administratively, and most of them have sufficient resources necessary to accomplish the desired goals.

It is proposed that a gradual implementation of the NRS project can now begin based upon pilot projects in a number of selected rural regions of certain states. Simultaneously, specific studies would be carried out.

In establishing pilot projects, the approach taken will be that the development of rural regions can best be achieved by optimizing the interchange of existing resources in a given rural region between an economically developed focal center and its less developed surroundings. It is desirable in this process to influence the largest possible area in order to minimize the number of such operations across a given state. An example would be the short distance commuting of people to a manufacturing and business center from a surrounding rural area which is attractive and would also have adequate provisions for health care, access to continuing and vocational education, cultural and recreational activities, and social interaction within and among communities.

In order to ensure maximum benefit, federal coordination of state-by-state efforts is necessary, especially in terms of transportation and communication. Federal agencies should serve as catalysts and provide the stimulation to individual states. Redistribution would not only involve decentralization of business and industry but of federal and state government operations. As a result, government would be more responsive to local needs.

It is unfortunate that today no single federal agency has the charter to cope with the many aspects of the solutions proposed by the NRS project. As a matter of fact, the cooperation of virtually all our federal departments is needed to provide a sufficiently funded and well coordinated effort.

It is the NRS' objective to include those federal agencies needed to participate in the next phase of this work in order to make implementation more feasible.

IV. Proposals for Specific Projects

Transportation

The redistribution of people from large urban centers to rural areas would have to be stimulated by a decentralization of government and business operations into a number of dynamic systems in which the role of transportation and communications and their interactions become crucial.

The need for efficient mass transportation, the extent of personal travel and the potential inter-relationships between transportation and telecommunications will become a primary part of the focal areas which NRS will propose based on the techniques developed as a part of its ongoing activity.

It has been argued that transportation links between rural towns and a larger population center disproportionately favor the larger community. There is good reason to believe that, since the use of communication systems is based on overcoming separation and minimizing physical movement, the effects on growth may favor the smaller communities.

The implication of this could have major significance on the relative investments between transportation and communications, where the issue is to strengthen rural communities in terms of quality of life as defined by the community's own planning proccesses. The Department of Transportation thus is facing decisions which may require it to embrace telecommunications as an integral part of transportation planning. Considerations regarding mass transportation versus individual personal travel with partial substitutability by communications, when superimposed on a system of rebalanced population

distribution such as outlined here, could only be planned optimally when both technologies are fully applied.

Keeping in mind the overall objective, namely to equalize at a maximum level the quality of life over the entire U.S. at minimum energy cost and accomplish this within the shortest time-span, a replication of the optimized sub-regional systems within individual states should be the immediate goal. Moving in this direction simultaneously in several states, with the full participation and planning by the states' governments, becomes an essential objective.

NRS proposes to expand the current work, both geographically and conceptually, in the following areas:

1. Considerably broaden and refine the techniques now under development for measuring the influence of communications on the economy of rural regions. The currently applied Harris Econometric Model would be extended toward a systematic examination of the means by which telecommunications can affect the integral development of economic focal points, together with the maximum surrounding region that can be influenced. The communications indices, as currently being developed, measure the impact of various forms of mass media, as well as modes of industrial communications, such as data handling in an industrial and business center of a rural region. The indices would be expanded and refined to embrace the use

of specific communications technologies needed for maximizing employment by government and by service industries and to extend their influence on surrounding rural areas in terms of improved health, educational and cultural services. The complementary roles of transportation and telecommunications will emerge as essential ingredients in these analyses.

2. Consider Certain Institutional Problems of Importance:

a) Which governmental, business or civic organizations will be affected by the processes outlined under 1., and what legal, legislative or public educational programs need to be developed in order to ease the enactment of necessary changes?

b) Which institutions and what methods need to be involved in the necessary long-range planning functions and which stimuli have to be provided in order for individuals to participate in such activities within their communities?

c) What institutional barriers need to be reviewed or, indeed, revised in order to arrive at the configuration of transportation and communication systems best able to achieve the desired optimum conditions within the region, given its focal point and surrounding areas? (Frequency allocation, Spectrum utilization, Transportation and Vehicular laws, Environmental regulations, etc.)

3. A major influence on the optimal balance between transportation and communication and on energy usage in the proposed rural models can result in the creation of local work-centers applying the NRS developed communication audits analyses and conferencing techniques. These centers, equipped with communication and office facilities, may permit employees to travel to the larger industrial locations less often, and only when face-to-face meetings or conferences are required. At other times, contacts by communications, and correspondence, could be concentrated into certain days, resulting in reduced travel by mass transportation or by individual vehicles. Application of this to the smaller regional models and also to the larger metropolitan-suburban systems could have significant implications on transportation and energy needs.

Urban Needs

NRS believes that the impact of a voluntary population distribution on the city will be significant, and lead to its becoming what may be called a Headquarters City, where the headquarters of business, commerce, the arts and sciences, of medicine and education are located. In some ways this is already the case in several of our large cities. The numerous divisions, services and subsidiaries of these headquarters operations could be dispersed throughout the respective state, using already developed or expanded telecommunications links, in concert with existing transportation.

To the extent that a voluntary decentralization from metropolitan areas has to become a national goal, the creation of employment opportunities by utilizing telecommunications is essential for people who are now unemployed or underemployed, and live there. The job training would be geared to the under-privileged people who would be migrating to the rural areas from the city. In addition, it would have to take into account those individuals who already live in the rural communities. In addition to job training, there must be a state and federal commitment to provide the opportunity to resettle, and assure employment in the place of destination. It is estimated that expenditures would be but a fraction of what the city now spends for direct and indirect costs associated with welfare. The application of telecommunications in these career training programs is a vital element, and a program is already underway with community colleges to put into effect the new techniques developed for this purpose.(13)

Within the metropolitan area, improvement in mass transportation is necessary and possible, and telecommunications can have considerable impact.(14)

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(13) Abstracts

(14) Ibid., NAE, June, 1971

Employment

In the section on "Urban Needs" the problem of employment is addressed. Accordingly, an outgrowth of business decentralization would be the creation of employment opportunities in rural areas, first for those living there and second, for those who are underemployed or unemployed from the metropolitan urban centers of the particular state. The training and retraining of these individuals in greatest need of jobs and desirous to relocate into rural communities will have to be done at state or Federal expense, and include the cost of relocation. One of the studies of the NRS project will be to show that such activities, including the relocation of the people involved to fill planned jobs would be, in the long-run, highly cost-effective when compared with the direct and indirect burdens on the city's or state's welfare budget. The opportunity for minorities and poor people, now confined to ghettos, to transfer with their families into attractive rural communities as wage earners represents a vital step towards improving the quality of life for this sizeable segment of our population.

In order to create new jobs in fural communities, a decentralization of business must occur. Based upon the studies and experiments carried out by the NRS project regarding the role of telecommunications in this process, it is proposed that specific implementation in appropriate regions of selected states be initiated. As stated earlier, the impact of transportation and communication and their complementarity will be key factors in creating acceptable living conditions in the rural communities.

An essential ingredient necessary to control the growth of a community, including the type of employment and the increase in population that are acceptable

should be based upon careful local planning, participated in by residents and coordinated with overall regional and state objectives. Communications technology could play a significant role such as a use of cable television as a tool for interaction among citizens and between government, as part of the planning and administrative process. An expansion of the planning study involving citizens, planning agencies, etc., which has been carried out by the NRS project in Willimantic, Connecticut,[15] would be undertaken. Such local planning should take into account the opportunities for minimizing travel within and betwen communities through telecommunications techniques and thus preserve energy resources, while making better utilization of existing transportation facilities.

The decentralization of government (state and federal) and the extent to which it reduces the operating costs of these agencies, are an important part of an overall distribution plan. NRS proposes to develop criteria to test, measure and evaluate the effectiveness of decentralized government operations in human and economic terms using its communications audit technique. An assessment of the various forms of communications technology, and their substitutability for travel would be part of the same study.

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(15) Ibid. Abstracts, Community and Communications Studies

Health Care Services

As described earlier in this paper, access to health care services in rural sections of the country is extremely poor. A significant reason for this is the lack of awareness by people in rural areas about health problems, and, therefore, a continuing education program needs to be developed to teach individuals about how to deal with sickness and emergencies, and thereby be better able to prevent or detect early symptoms and communicate effectively with physicians and other health personnel. Studies have indicated that, when education is made relevant to the health requirements of individuals and their families, it can produce significant improvement in their actions. As a consequence, people are able to react to health problems with more knowledge and confidence, and thereby reduce the need for expensive clinic and hospital facilities and services.

To educate people in home health care on a wide scale, they should be reached near to where they live and work and be able to follow a schedule most suitable to their needs.

A new electronic delivery system for learning called RTS (Rapid Transmission and Storage) has been developed for use in learning centers and would be employed in the proposed project. The low cost, high quality and flexibility of the recorded programs make this a very cost-effective way to apply health education across the country.(16)

In addition to educating the public about basic public health problems, it is also important to provide essential care when needed. The disparity between

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(16) Ibid.

the availability of medical services in urban areas (excluding the ghettos) and rural areas is considerable. Physicians tend to settle in urban and suburban areas, because their families prefer living conditions in the cities, just as 75% of the population does. Furthermore, there exists far greater professional stimulation through hospital and teaching facilities.

By utilizing allied health manpower in combination with technology, much can be done to improve the services needed. Suitable technology exists but it must be applied imaginatively in the provision of medical care. NRS proposes a program in specific areas in which clinics, manned by physician assistants, would be set up in the various townships, readily accessible by the residents.

Based upon tests and experiences thus far, the majority of cases can be handled by physician assistants. In the remaining instances, through telecommunications links, interconnecting these clinics to a nearby hospital, a supervising physician in attendance will be able to advise and assist. For further details see the Appendix.[17]

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(17) Ibid. Health Care Proposal for Northeast Connecticut

Adult and Vocational Education

Ever since the invention of the printing press, the primary means for transferring knowledge has been the instructor and the printed word. Today, in a world with ever accelerating changes, it is urgent to improve the process of learning. This is especially important in view of the fact that one quarter of our population has not completed high school, and some twenty percent of all adults want to learn some subject of their choosing - academic, vocational, home and hobby related, etc.

Educational institutions traditionally served only those who came to the Campus and it has been recognized only recently that a great many people would like to learn near where they live or work. The Community Colleges, of which there are some 1,200, are the ones which have become most alert to this challenge; and, at the same time, business and industry also recognized the value of employee training and education.

Community Colleges today are faced with more people wanting to learn more subjects in off-campus learning centers than can presently be satisfied. It is not economically feasible to send instructors to learning centers near where people live to teach all the subjects desired with schedule flexibility and at reasonable cost to the user.

To meet these needs, educators and scientists for the first time have combined to develop a method of learning and delivery which integrates the best available educational and technology resources into a universal system.

As a result, a new learning system called RTS (Rapid Transmission and Storage), was developed which is now scheduled to go into operation with a group of community colleges, later this year.

The following characterizes the RTS System:

1. Up to 30 one-hour, or 60 half-hour or 120 fifteen-minute programs, etc. can be stored on a one-hour standard 1" video cassette. Up to 30 of these can be shown simultaneously in that many classrooms. This satisfies the requirement of continuous enrollment, whereby people can start a new semester on any subject each week, or every other week, etc., to suit their own schedules.
2. Sound is the main medium and is illustrated with carefully selected or prepared picture and graphics material. For fullest comprehension and maximum retention, illustrations are carefully synchronized with the corresponding words to create a single impact on the student.
3. Motion is provided only when essential, for clarification or emphasis.
4. A wide choice of learning materials can be produced quickly and at low cost at a fraction of conventional video or motion picture presentation.

5. Programs can be stored on 1" video cassettes or transmitted over standard television stations, cable links, or microwave systems for viewing in regular time, or transmitted at rapid rate at night-time. (30 half-hour modules per hour).
6. Updating pictures and sound is an easy process and world-wide use is possible through a simple change in the sound track.
7. Printed materials are provided with RTS in the form of texts, administrative guide, and testing aids. It is possible to arrange the programs so that each lesson has built-in testing sections between the teacher and the students -- an important factor in any successful learning program.

Postal Service in Rural Areas

As part of improving rural life, mail delivery service needs to be improved throughout rural areas in the U.S. The next phase of the new comprehensive NRS program will address the areas of reliable and prompt mail or message service as individual state programs as follows:

1. Examination of issues on State-by-State Basis

a. Determination of maximum ranges in delivery time between central collection points in the state and outlying post offices of various districts (especially in remote areas).

b. Availability of preferable collection points in adjacent states.

c. Percentage of various classes of mail destined to different regions of the state particularly rural ones.

d. The degree of privacy desired for various classes of mail and type of mail or messages on which to focus initially.

e. Consider two-way terminals designed for these specific services, located at all distant and particularly remote post offices, utilizing alpha-numeric printout, with digital signals on standard phone lines. This could be utilized primarily at night-time (estimated capacity 10,000 pages, averaging 500 words each, per terminal between 6 p.m. and 8 a.m.).

For the transmission of documents, drawings, handwritten messages, etc., a portion of the night schedule may be devoted to facsimile with highest efficiency utilization of telephone circuits (maximum two minutes per page).

f. Investigation of optimum delivery system for new service between remote post offices and addresses.

2. Equipment considerations for this system

   a. Availability or adaptation of existing devices or systems.

   b. Cost of hardware and of operation.

   c. Degree of automation.

3. Delivery of electronic messages from post offices to distant addresses via TV or telephone, or both or other alternatives

4. Interstate and intrastate regulations, as well as telephone system interconnections.

5. Investigation of potential users of the rural mail or message system

   a. Government agencies - local, state, federal

   b. Business and industry

   c. Hospitals, laboratories, physicians' offices, etc.

   d. Law enforcement

   e. Schools, libraries, etc.

6. Proposal for specific pilot operations in selected states and regions, and their relationships with other NRS projects planned for the same places.

7. Implementation plan for full project activity, including cost, duration, and anticipated results.

Environmental Protection

The impact of a decentralized population pattern can have profound effects on current environmental regulations and their influence on the country's economy. The dispersion of power plants and automobile travel as a result of a more even distribution of people by the metropolitan and rural communities will result in less dense air and water pollution conditions should be more easily controlled on a local level. Industrial and residential waste would be decentralized at the same time, and could thus be better managed.

It is proposed to undertake planning studies regarding the influence of the various population distribution patterns on nationwide and regional environmental conditions. The impact of telecommunications on living conditions and transportation as an important factor in voluntary dispersal of people and jobs, is expected to result in significant easing of environmental constraints. The quantitative and qualitative changes in geographic and atmospheric dimensions of pollution patterns represent new approaches and will be an essential phase of the NRS project

ENERGY

As observed earlier, the rural, urban and energy problem appear to be closely interlinked and the timely solution of these is vitally important to this nation's future. Energy was not an issue when early in this century two-thirds of all Americans lived in rural communities. Pollution and almost total reliance on oil for electricity and transportation became problems of crisis proportions when migration from rural areas resulted in three-quarters of the population living and working in metropolitan regions.

The highly urbanized population pattern necessitates generating electric power from low-sulfur oil instead of coal to minimize pollution.

It is proposed to develop conditions for an optimal match between population distribution and the most efficient use of our energy resources. If a greater proportion of the population lived and worked according to a decentralized pattern, power generation could be dispersed as well. As a result, it might be possible to use coal, the country's most abundant energy source and apply existing techniques to remove contaminants in medium-sized and smaller plants. Simultaneously, losses in long

distance power lines would be significantly reduced.

Applying communications technology towards upgrading rural life thus holds the potential advantage of permitting U.S. energy production to shift more heavily toward the use of coal. The NRS approach also involves other fundamental ways by which reduction in energy needs may be realized. In the decentralized mode, the use of telecommunications technology could make all aspects of life in rural communities more attractive and permit business and government to disperse their operations from urban to rural areas. Through appropriate planning new homes, work places, and shopping facilities in revitalized rural towns would be located to reduce automobile travel. In addition, within and between these towns, telecommunication systems would be used as an alternative way of performing functions that presently necessitate travel. Calculations based on available data indicate that one-third of this country's gasoline consumption is due to cars being driven daily to and from work in our large metropolitan centers. Thus an examination of this nation's energy utilization based on current life patterns and a comparison with alternative modes of population distribution are likely to show that we may be able to attain reliance solely on our own energy resources for centuries

to come and at the same time maintain the highest quality of life among all nations.

This would permit us to develop prudently alternate sources of energy without haste and undue burden on our economy. A study has been outlined for this portion of the NRS project and is detailed as follows:

Phase I

a. identify relevant data on existing U.S. energy sources, their supply, and the cost effectiveness of their use.

b. determine anticipated new energy sources, their cost effectiveness and timetable for their availability.

c. explore possible methods whereby different patterns of population distributions can be related to corresponding energy needs.

d. specify the general nature of the data needed to carry out the proposed study and indicate how data, not already available, would be obtained.

e. indicate the various disciplines and level of effort required to undertake the overall study.

f. develop a schedule and phasing of the research tasks.

g. identify the anticipated products of the research and outline the expected impacts on the issues to be resolved.

h. estimate the cost of the overall project.

Phase II

1. Broad description of the energy problem in light of severe time and cost constraints.

2. Conventional and anticipated energy resources for the next 100 years.

   a. types, location, amount and accessibility of domestic energy reserves.

   b. cost of extraction, conversion, transportation, etc.

   c. environmental constraints: Land reclamation considerations; Pollution considerations

3. Present and future projected U.S. energy needs, through the year 2000, (for homes, business, industry, and transportation).

   a. Under the present population distribution, with 75 percent in Metropolitan Areas and 25 percent in Rural Areas.

   b. Under varying degrees of NRS population distribution, up to 50 percent in Metropolitan Areas, and 50 percent in Rural Areas.

4. Based on the above, determine the most cost effective means of supplying the energy needs under varying ranges of population distribution assuming the maximum feasible reliance on domestic resources. Make assessments for the following conditions:

   a. Current population distribution;

   b. Same projected to the year 2000;

   c. Varying degrees of dispersed populations (as defined under 3 b.) projected in 10-year intervals from now to year 2000.

5. In evaluating the effect of population distribution on energy utilization, the following factors and their interactions will be considered.

   a. The type and amount of resources used in comparison with known energy resource reserves.

   b. The cost of acquiring and processing the needed resources for the different formats of population distributions (take into account construction of new extraction facilities, power plants and energy distribution systems.)

   c. Degree of national self-sufficiency that would result from the alternative energy systems.

   d. Capital requirements for conversion of existing and construction of new facilities for the different energy systems.

   e. Effects of population distribution on pollution levels generated by dispersed electric power plants using coal.

   f. Effects of population distribution on pollution levels generated by automobiles and possible impact on greater fuel efficiency.

   g. Environmental implications of strip mining under the various energy systems proposed above.

Communication Services

Communications technology is a crucial factor in providing rural communities with the necessary services to make them viable alternatives to urban life. However, there still remains a sizable portion of our population, outside of urban centers, without access to an adequate TV broadcast service. An even larger fraction have virtually no cultural and recreational opportunities available to them as do urban residents.

It is unfortunate that a notion such as the "Wired Nation" was created, giving the impression that all of rural America can be made accessible by means of cable TV. To provide all rural homes including farms with adequate cable TV service would create an enormous economic strain, and regulatory problems of such magnitude that their implementation, if feasible at all, may require the balance of this century. A study carried out by the Denver Research Institute (18) dealt with this problem of trying to develop a terrestrial solution to the "Wired Nation".

At the NAE-NASA 1974 Summer Study, a broadcast satellite system was recommended called "Rural-Sat", an approach distinctly different from the Denver Research Institute's proposal of a terrestrial system.

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(18) The Denver Research Institute (DRI) Studies

Requiring only a modest investment by the users, the system can make adequate broadcast service available to all rural residents, including farmers, and those in isolated and low density areas, etc.

"Rural-Sat" consists of a pair of special communication satellites in synchronous orbit over the equator in such a way as to cover optimally the U. S.

The basic role of the Rural-Sat System is to upgrade life in all rural homes, whether in communities or on farms. It will perform three types of broadcast services:

1) A national coverage with an adequate number of channels capable of being received with minimum investment in any home, but intended primarily to serve rural and farm families.

2) Regional broadcast programs each covering approximately one-quarter of the U.S., corresponding to the time zones.

3) A new high-resolution color TV broadcast system for theater projection anywhere in the country, of live cultural events, originating in the major metropolitan centers such as theater, opera, ballet, museums, conventions, etc.

In the following the technical description and details of the Rural-Sat system are given as published by the National Academy of Sciences end of 1975 from the Panel on Uses of Communications to the Space Applications Board of the Assembly of Engineering, National Research Council.

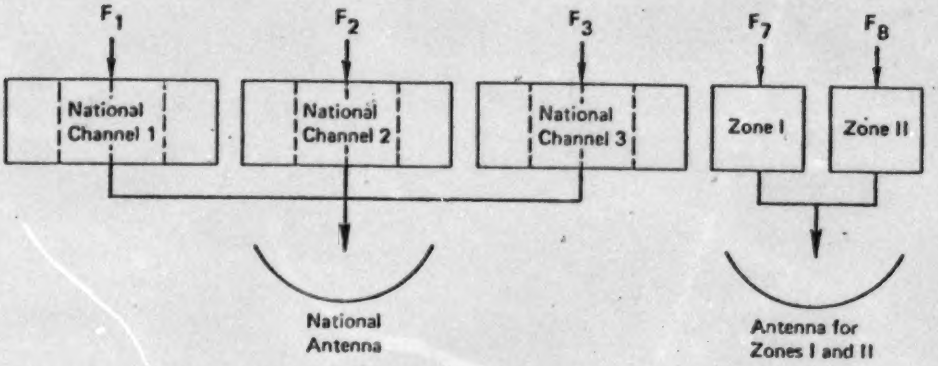
CONCEPT FOR A NATIONWIDE SATELLITE COMMUNICATIONS SYSTEM TO SERVE RURAL AREAS

To fulfill the need to make rural America attractive for more people and to deliver to the home continuing vocational and health education as well as regional and community information, in addition to the entertainment and public affairs offerings on national TV, the Panel offers a concept of a synchronous communications satellite system consisting of two identical satellites, each with fourteen 40 MHz TV transponders each with 100 watts output. Typically, the total of 28 transponders can be utilized as follows. On Satellite I, three 400 watt high-power signals are produced by combining 4 output stages for each of three national TV channels corresponding to the commercial networks. These three TV signals, each 40 MHz wide, are fed to the same antenna, covering the entire U.S. Two more channels on the same satellite serve regions I and II, approximately corresponding to Time Zones I and II, counting from the West. Satellite II has two national broadcast channels, again each combining the output from four 100 watt transmitters. One of these channels could be assigned to the Public Broadcast Service and the other to cable networking or for educational-health care services. Of the remaining six 100 watt transmitters, two serve Time Zone III and four broadcast to Time Zone IV (East Coast of the U.S.). This makes it possible on the average for 6 states to share one transponder. Thus, within a given region or time zone, each state can have a one-sixth share of a broadcast day to transmit pertinent local or regional information which can be received everywhere within the zone. Each satellite would have two antennas, the smaller one taking the broadcast feeds covering the entire nation, and the large antenna serving the individual zones.

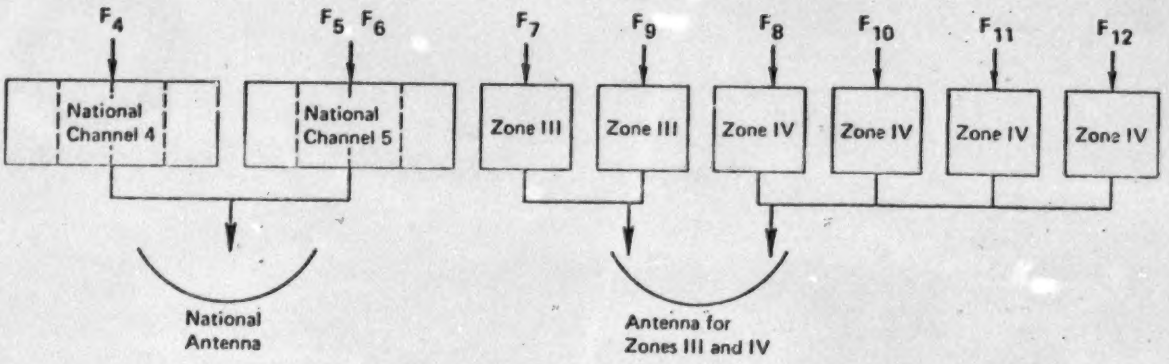
Figure I illustrates the above and also the number of 40 MHz channels transmitted by the two satellites. The twelfth 40 MHz channel, namely F_6, is reserved to be combined with F_5 providing an 80 MHz wide special broadcast channel for the high-resolution color TV signals for theater projection discussed under "Teleculture."

Regarding reception, it is estimated that a two-meter antenna, together with a 250° receiver and using a parametric amplifier at room temperature, will provide commercially acceptable pictures anywhere in the U.S.

Satellite 1



Satellite 2



LIST OF SYMBOL DEFINITIONS

λ	-	Wavelength
Θ	-	Antenna beamwidth
Θ_1	-	Antenna North-South beamwidth
Θ_2	-	Antenna East-West beamwidth
Θ_R	-	Receiver antenna beamwidth
B	-	Transponder bandwidth
b	-	Video base bandwidth
C/N	-	Carrier to noise ratio
D	-	Antenna diameter
EIRP	-	Effective radiated power (dBW)
F	-	Noise figure (ratio)
G_R	-	Receiving antenna gain
G_R/T	-	Receiving antenna figure-of-merit
G_T	-	Transmit antenna gain (on-board satellite)
I	-	FM improvement factor if (C/N) is above a 13 dB threshold
L_S	-	Space loss - given as $\left(\frac{4\pi R}{\lambda}\right)^2$
L_I	-	Incidental loss and atmospheric attenuation
m	-	Modulation factor
P_T	-	Transmitter power (on-board satellite)
R	-	Distance from satellite to terrestrial receiver (about 39,000 km in continental U.S.)

S/N - Signal to noise ratio

T_A - Antenna temperature

T_O - Room temperature, i.e., 290° K

T_R - Noise temperature of receiver only

T_S - System noise temperature

Direct Broadcast System at 13 GHz (2.5 cm)

Antennas

3 m

$\Theta_R = 70 \frac{\lambda}{D} = .58°$

$G_R = .55 \left(\frac{\pi D}{\lambda}\right)^2 = 48.9$ dB

2 m

$\Theta = .89°$

$G_R = 45.4$ dB

Receivers (standard receiver)

$F_R = 6$ dB, $T_O + 290°$ K

$T_S = T_A + (L - 1)T_O + L (F_R - 1) T_O$

For a line loss of 1 dB and an antenna temperature of 20°K

$T_S = 1190°$

For a "state of the art" but still uncooled receiver

$F_R = 2.7$ dB (This corresponds to a receiver temperature of 250° K.)

$T_S = 410°$

The possible receiver "figures of merit" G/T_S are

	6 dB	2.7 dB
3 m	18.1	22.9
2 m	14.6	19.3

(G/T_S) in dB/°K

The total 12 GHz band available for down link domestic service is 500 MHz wide from 11.7 GHz to 12.2 GHz. We assume a color TV bandwidth of 6.0 MHz and an RF channel of 38 MHz available for deviating the signal.

$$m = \frac{B}{2b} - 1$$

$$m = 2.17$$

The FM improvement (post-detection to pre-detection in the full RF bandwidth) is given by the usual expression

$$I = 3m^2 (m + 1)$$

$$I = 16.5 \text{ dB}$$

The basic RF link equation (in dB) can be written as

$$\frac{C}{N} = EIRP - L_S - L_I - B + \frac{G}{T_S} + 228.6$$

L_S = Space Loss = $\left(\frac{4 \pi R}{\lambda}\right)^2$ = 206 dB at 12 GHz and 39,000 km

L_I = incidental loss = 5 dB (All the atmospheric effects in this single term have been considered together.)

B = 38 MHz = 75.8 dBHz

EIRP = $P_T G_T$

If one assumes 100 watt transmitter power and U.S. time zone coverage, one should make the calculation using an antenna beamwidth of about 2° x 3°. A 2° circular beam will cover an elliptical area of 800 by 1100 n. mi (a U.S. time zone is about 600 n. mi across by 1000 n. mi long). This allows margin for many alterations in the ultimate specific design. The "footprint" of the antenna will flare out more as the satellite location is offset from the central U.S. It probably should be over the Pacific west of California to cause local midnight and satellite eclipse, when it occurs during the equinoxes, to take place in the early morning hours over the U.S. The battery weight will thus be reduced considerably..

$$G_T = \frac{26,600}{\Theta_1 \Theta_2} = 36.5 \text{ dB (good approximate formula for any large reflector)}$$

EIRP = 20 dBW + 36.5 dB = 56.5 dBW

$$\left(\frac{C}{N}\right) = 56.5 - 206 - 5 - 75.8 + 228.6 + \left(\frac{G}{T_S}\right) = -1.9 + \left(\frac{G}{T_S}\right)$$

By tying four of the 100 watt amplifiers together and feeding the output to the appropriate antenna, the entire U.S. will be covered with the national signals.

Earth Station	Receiver (G/T_S) dB/°K	(C/N) dB	(S/N) dB
2 m antenna - 6dB receiver	14.6	12.7	-
3 m " - 6dB receiver	18.1	16.2	32.7
2 m " - 2.7 dB receiver	19.3	17.4	33.9
3 m " - 2.7 dB receiver	22.9	21.0	37.5

The (S/N) column is the sun of the (C/N) value and the 16.5 dB FM improvement. The first case is inadequate in terms of margin over the FM threshold for (C/N) of about 13 dB. These numbers are rms signals to unweighted noise without pre-emphasis. On this basis, the EBU asks for 33 dB and this signal level corresponds closely to TASO "fine" quality.

Widband High-Resolution Case:

If we use two channels we have an effective bandwidth

$$B = 76 \text{ MHz}$$

$$B = 78.8 \text{ dBHz}$$

For the same 100 watt transmitter (we now have two since we will use two channels), we have a greatly improved picture since the (C/N) remains constant (EIRP increases 3 dB while B also increases 3 dB). On the other hand

$$m = 5.5$$

$$I = 27.7 \text{ dB}$$

This represents an excellent picture with any receiver above threshold. If only 100 watts are used for the double bandwidth, then the (C/N) drops 3 dB and only the receivers with a 2.7 dB noise figure make the threshold (2 m and 2.7 dB). Again, the FM improvement is high enough to ensure excellent picture quality.

If wider area coverage is required, the greater transmitter power compensates nicely for the lesser antenna gain when several channels are used. Thus, again combining the outputs of four 100 watt amplifiers and feeding this to the wide angle antenna to cover the entire U.S., a highly acceptable picture will be produced on the ground with a receiver noise figure slightly better than the 2.7 dB.

In addition to this primary mission, the Rural-Sat can perform a number of other functions to fill rural needs, such as electronic mail and educational and health services. These are described in detail below:

1) The Use of the Rural-Sat as a Main Communication Link for Electronic Mail

The Rural-Sat system as previously described, provides a double bandwidth channel for the high-resolution theater TV service. Assuming that the use of this extra wideband channel for broadcasting of live cultural events is averaging four hours per 24-hour day, then that channel could be used 20 hours per day for relaying electronic mail. Augmenting this with a partial use of the regional channels for mail service, one could realize the equivalent of a full 24-hour use each day with an 8MHz video band and 80MHz RF channel. This could handle yearly 2.5 billion pieces of mail (single page). Based on a surcharge of 50¢ per page for satellite mail, the yearly income generated would be one and a quarter billion dollars. Because of the low cost of the receiving terminals, every post office in the U.S., including the smallest rural ones could afford a receiving station. At the same time many businesses, government agencies, institutions, etc. could receive electronic mail directly from the satellites only a fraction of a second after it was transmitted from the ground-

station nearest to the collection center. Appropriate coding techniques will assure necessary privacy. A ground network is required for forwarding electronic mail from a given region's post offices to a ground station which then transmits it to the Rural-Sat. Postal stations serving small communities or low-density areas will only require narrow band (conventional telephone) or 48 kHz lines to intermediate post offices from where signals are speeded up and forwarded over broadband links to the nearest ground station. Businesses and government operations with high mail traffic would have direct links to and from the nearest post office thus bypassing local processing.

It is important to stress that the complexity of a national electronic mail system rests not only in the satellite collection and distribution system, but more so in the high-speed paper handling and scanning equipment located in a large number of post offices all over the country. The magnitude of such installations will depend on the amount of traffic flowing through the particular post office which is also the determinant for the bandwidth of the communication channel feeding out of that postal office. Thus, slow-speed paper handling and electronic scanning equipment would be less complex and expensive.

2) National and Regional Educational Services

A new type of instructional service is described, using the Rural-Sat system at nighttime, when normally most TV transmitters are off the air. The new learning format and technology, which permits a highly compressed transmission and storage of lessons of any length, based on a carefully composed sound and still-picture presentation, and using motion only when necessary, has been developed and is available for the Rural-Sat. If we assume the use of one pair of satellites (5 national and 8 regional channels), then one national channel could be employed together with the 8 regional channels for seven hours of night transmissions (one hour of the total of eight night hours would be reserved for augmenting the postal service as described previously under No. 1). The educational programs, which would be primarily instructional, would be divided into the following categories:

Supplemental Audio-Visual Material for:

Primary and secondary schools.

Complete Courses for:

Continuing adult education, with or without college credits;

Vocational and job improvement

Professional education for physicians, lawyers, scientists, etc.

Health care for residents

Home care, etc.

Existing learning centers would be used nationally, employing receiving equipment already developed for this purpose, and low enough in cost to permit widest distribution. Such learning centers in rural communities or cities, would be in churches, schools, libraries, hospitals, prisons, community centers, etc., and the courses recorded at nighttime would be stored for the next day's classes.

One national and eight regional channels together can transmit close to 2000 different half hour lessons each night. The eight regional channels could be shared nightly by each of the 48 states (19) permitting each state to transmit 42 of its own programs. It should be noted that the transmissions by each state within a zone could be received by all of the region's population. Thus, various states could coordinate their programs so as to minimize duplication and jointly provide the maximum choice.

In order to upgrade life in rural communities, it is essential that physicians and other professionals be attracted to settle there. The system just described also makes it possible to better serve such individuals in terms of information and instruction. For example, physicians and other health manpower do not have available the time necessary to familiarize themselves with all the professional literature that reaches their desk.

(17) If Alaska and Hawaii are to be included in the Rural-Sat program, the satellite design would be suitably modified without much additional cost

In response to this need, an entirely new, comprehensive health program is proposed, which takes advantage of the RTS format and delivery system.

The new service for physicians and allied health manpower would be provided at the local hospital or other health facility.

1. Physician Information

As a result of their heavy work schedules, doctors do not have an opportunity to study the wealth of material published related to the uses of certain drugs, and their relationship to various diseases, etc. Often, unwittingly, a physician errs in prescribing certain medication, and the outcome can be serious.

It is suggested that jointly with one or more pharmaceutical houses, programs be developed that focus upon the uses and abuses of pharmaceuticals and drugs. These mini-courses would not substitute for detail men, but rather would support their efforts, by reenforcing and sharpening the information content in the literature. Stress would be upon the advantages of certain pharmacological aids, research underway, etc. The company sponsoring the program would be identified at the end of the segment, as part of a public service message.

2. Physician's Continuing Education and Re-certification

As part of the same philosophy, course material would be undertaken to provide continuously updated information regarding particular fields of interest, such as internal medicine, allergy, pediatrics, etc. More intensive programs would also be generated for use in preparation for Board re-certification examinations.

3. Nurses and Allied Health Manpower

Concurrently with educating the physician and public about trends and events in health care, it is vitally important not to exclude the nurses and other ancillary personnel. Programs would be developed to provide information concerning the work of the nurse - including regulations and legislation affecting that profession - as well as course material to encourage career opportunity for medical technicians and other support people.

The ability of the RTS system to transmit at nighttime a wide variety of programs means that it lends itself especially well to the Rural-Sat proposal. Central to the success of the system is the capacity to select from a vast range of courses.

In summary, the Rural-Sat system proposed will make it possible to provide rural communities with those essential components necessary to assure a viable life style.